

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

<p>In re United States Patent Application of:</p> <p>Applicant: SHIMURA, Tokihiro</p> <p>Application No.: 10/690,073</p> <p>Date Filed: October 21, 2003</p> <p>Title: ABRASIVE, AND ABRASIVE MANUFACTURING METHOD AND DEVICE</p>	<p>} Docket No.: 4230-101</p> <p>} Conf. No.: 6700</p> <p>} Art Unit: 1755</p> <p>} Examiner: Michael A. Marcheschi</p> <p>} Customer No.: 23448</p>
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**DECLARATION OF TOKIHIRO SHIMURA UNDER 37 C.F.R. § 1.132
IN U.S. PATENT APPLICATION NO. 10/690,073**

Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Sir:

I, Tokihiro Shimura, hereby declare:

1. THAT I am the sole inventor of the subject matter disclosed and claimed in United States Patent Application No. 10/690,073 filed on October 21, 2003 in the United States Patent and Trademark Office, entitled "ABRASIVE, AND ABRASIVE MANUFACTURING METHOD AND DEVICE," hereafter referred to as the "Application."
2. THAT I have a BACHELOR degree in METALLURGY from THOHOKU UNIVERSITY, SENDAI, JAPAN.

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3. THAT I have been employed for 17 years in PACIFIC METAL CORPORATION, and 9 years in EPSON ATMX CORPORATION, performing research and development in the area of powder metallurgy, and currently hold the position of General Manager of Powder Business in EPSON ATMX CORPORATION;
4. THAT I have been a member of JAPAN POWDER METALLURGY ASSOCIATION for 8 years;
5. THAT I am named as a co-author of multiple technical publications relating to materials science and powder metallurgy, including for example: "Process for Production of Ti Sintered Compacts Using the Injection Molding Method," J.Jpn.Soc.Powder Metallurgy, Vol. 46, No. 8, pp. 870-876 (1999); and "Sintered Compact Properties of Pre-alloyed 2%Ni-Fe Water Atomized Powder," J.Jpn.Soc.Powder Metallurgy, Vol.52, No.6, pp. 437-441 (2005);
6. THAT I am named as a co-inventor of multiple patent applications relating to materials science and powder metallurgy, including the present application and U.S. Patent No. 6,254,661 entitled "Method and apparatus for production of metal powder by atomizing," corresponding to International Application No.PCT/JP1998/003774;
7. THAT I am highly familiar with powder metallurgy in general and with preparation of powdered abrasive compositions specifically, and consider myself to have at least a level of ordinary skill in the preparation of powdered abrasive compositions;
8. THAT the Application as originally filed broadly discloses and claims abrasives composed of metal inorganic powders and that the Application broadly claims such abrasives in the following independent claim 1:

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1. An abrasive composed of an inorganic metal powder that comprises titanium in an amount of not more than 0.1 wt% and comprises silicon in an amount of at least 0.8 wt%, is absent of boron and aluminum, and meets all the following conditions:
 - (1) its true specific gravity is 4 g/cm³ or more;
 - (2) its average particle diameter is from 5 μ m to 50 μ m inclusive;
 - (3) its maximum particle size is 100 μ m or less;
 - (4) its hardness (HMT) is from 110 to 340 inclusive; and
 - (5) each particle of said powder has a substantially homogeneous composition throughout its volume.
9. THAT I am aware that the Application has been examined by the United States Patent and Trademark Office, that I am aware that an Office Action was issued on March 27, 2007 by the United States Patent and Trademark Office, and that I am aware that the claims of the Application as existed on March 27, 2007 were rejected for lack of enablement of a powder containing silicon in an amount of at least 0.8 weight percent when titanium is present, and on various prior art grounds;
10. THAT abrasives useful for grinding various articles including workpieces and containing widely varying amounts of silicon (e.g., in the form of silica (SiO₂) and other chemical forms) have been well known in the art for years prior to the October 28, 2002 filing date of Japanese Patent Application No. 2002-313341 on which the present U.S. patent application is based;
11. THAT the present application discloses various abrasive compositions having amounts of silicon exceeding 0.8 weight percent, including compositions having silicon in amounts of 1.3 and 1.4 weight percent (e.g., see application page 17), such that upon reading the present application, a person of ordinary skill in the art at the time my invention was made would readily understand that the invention is not limited to abrasive compositions having exactly 0.8 weight percent silicon, whether or not the abrasive further contains titanium in the absence of boron and aluminum;

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12. THAT the performance of abrasive compositions including amounts of silicon exceeding 0.8 weight percent within the scope of the claims of the present invention – including when the abrasive further contains titanium in the absence of boron and aluminum – could be predicted by one of ordinary skill in the art at the time my invention was made, since the effect of silicon content on specific gravity, hardness, and other pertinent characteristics of an abrasive powder could be predicted from any of scientific texts and conventional testing methods that do not require undue experimentation;
13. THAT, with the benefit of reading the present application, a person of ordinary skill in the art at the time my invention was made would be easily able to produce abrasive compositions as presently claimed – including amounts of silicon exceeding 0.8 weight percent when the abrasive contains titanium in the absence of boron and aluminum – by merely adjusting the proportion of ingredients supplied to the tundish of the manufacturing device shown and described in the present application, and then measuring the specific gravity, particle diameter / particle size, and hardness characteristics of the resulting powder using conventional methods without require undue experimentation, such that one skilled in the art could easily determine, without undue experimentation, the operable ranges of silicon when the abrasive contains titanium in the absence of boron and aluminum;
14. THAT no special chemical reactions or unpredictable processes must be employed to produce abrasive compositions including amounts of silicon exceeding 0.8 weight percent when the abrasive contains titanium in the absence of boron and aluminum, within the scope of the claims of the present application; and

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15. THAT the process of forming a molten metal from multiple constituents and ejecting such molten metal through a small atomization nozzle to form particles of a maximum size of 100 μm , forms droplets in which there exists no measurable stratification of constituent materials, such that upon cooling, each resulting particle has a substantially homogeneous composition throughout its volume; and that such inherent result is understood by any person of ordinary skill in the art,

As a below-named declarant, I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements, and the like, so made are punishable by fine or imprisonment, or both, under Section 1001 or Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Respectfully submitted,

TOKIHIRO SHIMURA
TOKIHIRO SHIMURA

Dated: 22. June 2007